

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (withdrawn): A pulse laser system composed of a plurality of replaceable modules, comprising;

an ultrafast oscillator module;

a nonlinear amplifier module receiving the oscillator output and amplifying the signal while broadening its spectral width;

an isolator module for eliminating feedback into the oscillator;

a stretcher module for temporally stretching the output of said isolator/polarizer oscillator;

a linear pre-amplifier module for amplifying the stretched output;

a down-counter module for controlling the repetition rate of the laser system;

a power amplifier module for amplifying the output of the down-counter module; and

a compressor for temporally shortening the output of said power amplifier module.
2. (currently amended): A pulse laser system composed of a plurality of replaceable modules, comprising;

an ultrafast oscillator module;

a stretcher module for temporally stretching the output of said oscillator module;

a spectral filter module placed before or after said stretcher module;

an amplifier module receiving and amplifying the stretched output;
an isolator module;
a linear pre-amplifier module for amplifying an output of said isolator module;
a down-counter module for reducing ~~controlling~~ the repetition rate of the laser system;
a power amplifier module for amplifying the output of the down-counter module; and
a compressor for temporally shortening the output of said power amplifier module.

3. (original): A system as claimed in claim 2, wherein said source is an ultrafast oscillator,
and further including isolator means for isolating said oscillator from a first of said
amplifier stages to a level of at least 35dB.

4. (currently amended): A pulse laser system, comprising the following components:

a signal source;
a stretcher ~~for~~ temporally stretching an output of said source;
a fiber amplifier; and
a compressor ~~for~~ recompressing an output of said amplifier; and
an AOM ~~for~~ selecting output pulses from said amplifier;

wherein each of said components is provided as a pre-tested module, and said system is
constructed by connecting said modules via simple fiber splices,

at least one tap unit within or between ones of said modules, configured to permit
measuring a spectrum within or between said modules, and
at least one spectral filter narrowing the spectrum of the signal source,

wherein at least one of said tap units is located downstream of said filter and configured to permit monitoring of said narrowed spectrum.

5. (withdrawn): A system as claimed in claim 1, wherein ASE is spectrally separated from the signal by one or more of said compressor and at least one of said amplifiers.

6. (withdrawn): A system as claimed in claim 1 or 2, wherein an attenuator module which attenuates the oscillator output is located between said oscillator and said non-linear amplifier; and PM-PM splices are used to join said modules.

7. (currently amended): A system as claimed in claim [1 or] 2, further including tap modules between one or more selected ones of said modules.

8. (currently amended): A system as claimed in claim [1 or] 2, further including polarization modules located between selected ones of said modules.

9. (currently amended): A system as claimed in claim [1 or] 2, wherein said down-counter module comprises an AOM, and additionally serves as a bandwidth filter.

10. (withdrawn): A system as claimed in claim 1, further including a spectral filter between said oscillator module and said nonlinear amplifier.

11. (withdrawn): A system as claimed in claim 1, wherein said preamplifier has a gain bandwidth narrower than the spectrum from the non-linear amplifier, to spectrally filter the output from said non-linear amplifier, said non-linear amplifier shifting ASE to shorter wavelengths away from the signal.

12. (currently amended): A system as claimed in claim [1 or] 2, wherein said power amplifier includes a diode-based pump, and serves as a spectral filter.

13. (original): A system as claimed in claim 2, wherein said oscillator produces a relatively broad spectrum output above approximately the 10nm range, and wherein an attenuator module attenuates the oscillator output.

14. (currently amended): A system as claimed in claim [1 or] 2, wherein the pulse signal output from said compressor is in the fs regime.

15. (currently amended): An all-fiber chirped pulse amplifier system composed of a plurality of modular optical subassemblies, comprising;

at least an oscillator module, a stretcher module, an amplifier module and a compressor module, each subject to separate assembly and test, and coupled into the system by a fiber splice;

at least one and up to $n - 1$ ~~tap units selectively~~ means located between respective ones of said modules for connecting test equipment for monitoring spectrum and pulse quality at each location, at least to identify uncompressible pulse components, test, monitoring or feedback where n is the number of said modules and

at least one and up to $n-1$ means between ones of said modules for improving fidelity of the polarization state.

16. (currently amended): A pulse laser system, comprising;

a signal source;

a stretcher for temporally stretching an output of said source;

a fiber amplifier; and

a compressor for recompressing an output of said amplifier; and

an AOM unit combining the functions of pulse selection and bandwidth filter, said AOM unit comprising an AOM, lenses, and a fiber receiving the output from the AOM and said lenses for selecting output pulses from said amplifier and serving as a bandwidth filter.

17. (withdrawn): A pulse laser system, comprising;
- a signal source;
- a stretcher for temporally stretching an output of said source;
- at least one fiber amplifier stage; and
- a compressor for recompressing an output of a final amplifier stage; and
- wherein a length of one of said amplifier stages is selected to remove ASE at the lasing wavelength, and said compressor serving as a spectral filter.
18. (withdrawn): A system as claimed in claim 17, further including an AOM for selecting output pulses from one of said amplifier stages.
19. (withdrawn): A system as claimed in claim 17, wherein said signal source is an ultrafast oscillator, and further including filter means for spectral matching between said oscillator and a first of said amplifier stages.
20. (withdrawn): A system as claimed in claim 17, wherein said signal source is an ultrafast oscillator, and further including isolator means for isolating said oscillator from a first of said amplifier stages to a level of at least 35dB.
21. (withdrawn): A chirped-pulse amplification system, comprising;
- a signal source;
- a stretcher module;

at least one amplifier stage, including a non-linear amplifier module and a linear amplifier module;

a compressor module; and

wherein said non-linear amplifier broadens the spectrum of the signal by at least a factor of 2 by self-phase modulation, and said linear amplifier serves as a spectral filter by a mechanism including at least gain narrowing.

22. (withdrawn): A system as claimed in claim 21, wherein said compressor module further operates as a spectral filter.

23. (currently amended): A chirped-pulse amplification system, comprising;

an ultrafast oscillator signal source;

at least one amplifier stage;

a compressor module; [and]

at least one isolator module between said oscillator and a first of said amplifier stages

[for] providing at least 35dB isolation therebetween; and

a spectral filter within said isolator module, narrowing a spectrum of a signal output from said oscillator.

24. (currently amended): A chirped-pulse amplification system, comprising;

an ultrafast oscillator module;

a spectral filter narrowing a spectrum of a signal output from said oscillator;

at least one amplifier module;

a down-counter module;

a compressor module; and

means between selected ones of said modules for improving fidelity of the polarization state.

25. (withdrawn): A system as claimed in claim 17, where said length is approximately 4m.

26. (withdrawn): An active stabilization system for a fiber amplification system, comprising:

a power amplifier including a gain fiber,

a pump source for said power amplifier,

means for directing a portion of the pump light from said pump source into a monitor

fiber identical to or equivalent to said gain fiber, so as to clone a temperature dependent spectrum of said gain fiber; and

feedback means for controlling a parameter of said pump source so as to match the pump source wavelength with an absorption spectrum of the gain fiber.

27. (withdrawn): A system as claimed in claim 26, wherein said directing means comprises a tap unit.

28. (withdrawn): A system as claimed in claim 26, wherein said directing means includes means for collecting scattered or spurious pump light from said pump source.

29. (withdrawn): A system as claimed in claim 26, wherein said controlled parameter is a temperature of said pump source.

30. (withdrawn): A system as claimed in claim 26, wherein said monitor fiber is said gain fiber.
31. (withdrawn): A system as claimed in claim 26, wherein said gain fiber and said monitor fiber are in substantially or fully in thermal contact with one another.
32. (withdrawn): A system as claimed in claim 26, wherein said power amplifier is side-pumped.
33. (original): A chirped-pulse amplification system, comprising;
a signal source;
at least one amplifier module;
a compressor module; and
an AOM module located within said amplification system and operating as a pulse deflector, said deflector introducing spatial dispersion; and
said compressor module comprising a bulk grating compressor compensating for said spatial dispersion.
34. (original): A system as claimed in claim 33, wherein said AOM deflector serves as one stage of said compressor.
35. (original): A system as claimed in claim 24, wherein said means between selected ones of said modules comprises a polarizer module which contains at least a polarizer unit tunable to reject light propagating in an unwanted polarization state.
36. (original): A system as claimed in claim 35, wherein one or more of said polarizer modules contain one or more isolator units.